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Tenascin C in Stem Cell Niches: Redundant, Permissive or Instructive?

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Key Words

- Stem cell niche
- Forebrain
- Gene trap

Abstract

The stem cell niche provides the specialized environment that is able to sustain the lifelong maintenance of stem cells in their discrete locations within organs. The niche is usually composed of several different cell types and a specialized extracellular matrix consisting of many different constituents. Additionally, a variety of growth factors are secreted into the extracellular space and contribute to the functional organization of the niche. Here, I will concentrate on the multimodular extracellular matrix glycoprotein tenascin C (Tnc) and discuss it as an exemplary molecule that is present in several stem cell niches. In spite of its intuitively suggestive presence, it has been difficult to provide functional evidence for the importance of Tnc in the context of stem cells. In the nervous system, the careful analysis of Tnc-deficient mice has revealed that the developmental program neural stem cell pass-through is delayed due to changes in growth factor responsiveness. To gain further insight, we have employed the gene trap technology in neural stem cells to identify potential Tnc target genes. This approach has surfaced 2 interesting candidates that may contribute to a better understanding of the signal(s) elicited by Tnc in neural stem/progenitor cells in the niche.

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